U.S. Energy Information Administration

‹ Countries

Angola

Last Updated: Febuary 5, 2014 (Notes)
Revised: September 17, 2014 (revision)
full report

Background

Angola is the second-largest oil producer in Sub-Saharan Africa, behind Nigeria. The country experienced an oil production boom between 2002 and 2008 as production started at several deepwater fields. In 2007, Angola became a member of the Organization of the Petroleum Exporting Countries (OPEC).

The first commercial oil discovery in Angola was made in 1955 in the onshore Kwanza (Cuanza) basin. Since that discovery, Angola's oil industry has grown substantially, despite a civil war that occurred from 1975 to 2002. Currently, oil production comes almost entirely from offshore fields off the coast of Cabinda and deepwater fields in the Lower Congo basin. There is small-scale production from onshore fields, but onshore exploration and production have been limited in the past due to conflict.

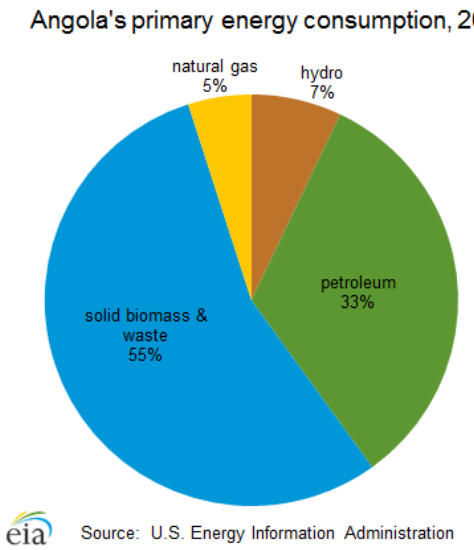
In 2013, Angola produced 1.8 million barrels per day (bbl/d) of petroleum and other liquids, of which more than 1.7 million bbl/d was crude oil. Angola's oil production grew by an annual average of more than 15% from 2002 to 2008 as production started from multiple deepwater fields that were discovered in the 1990s. The first deepwater field to come online was the Chevron-operated Kuito field (block 14) in 1999. Since then, international oil companies (IOCs), led by Total, Chevron, ExxonMobil, and BP (formerly called British Petroleum), have brought on additional deepwater fields and are in the process of developing new ones.

Angola is a small natural gas producer, ranking eighth in the region in dry natural gas production in 2012. The vast majority of Angola's natural gas production is associated gas at oil fields, and it is vented, flared (burned off), or re-injected into oil wells. Angola's first liquefied natural gas (LNG) plant started operations in 2013 to commercialize the country's natural gas resources. However, the LNG plant is currently producing well below its capacity of 5.2 million tons per year because of technical problems.

Angola's economy is largely dependent on oil production. Oil revenue accounted for almost 80% of total government revenue and grants in 2011, according to the International Monetary Fund (IMF). The U.S. Energy Information Administration (EIA) estimates that net oil export revenues in Angola were $68 billion in 2012. Angola's dependence on oil revenue makes it vulnerable to oil price volatility. During Angola's oil production boom from 2002 to 2008, gross domestic product (GDP) grew by an annual average of 15%, according to data from the World Bank. GDP growth fell to 2.4% in 2009 due to the global financial crisis and the drop in oil prices, but it recovered to 6.8% in 2012 as oil prices increased.

Despite being the third-largest economy in Sub-Saharan Africa, in terms of GDP, around 36% of Angolans live below the poverty line, according to the United Nations Development Program. The latest 2010 estimate from the World Bank indicates that only 40% of Angolans have access to electricity, leaving about 8 million people without access. As a result, the majority of people typically use traditional solid biomass and waste (typically consisting of wood, charcoal, manure, and crop residues) to meet off-grid heating and cooking needs, mainly in rural areas. In 2011, about 55% of the Angola's primary energy consumption consisted of traditional solid biomass and waste.

Source: CIA Factbook.



Management of the oil and natural gas industries

Sonangol, Angola's national oil company, is a shareholder in almost all oil and natural gas exploration and production blocks. International oil companies (IOCs) from the United States and Europe lead oil and natural gas exploration and production in Angola. Companies from China also participate in the industries, but mostly as shareholders in exploration blocks.

In 1976, the government of Angola created a national oil company, the Sociedade Nacional de Combustiveis de Angola (Sonangol). Sonangol is currently a shareholder in almost all oil and natural gas production and exploration blocks in Angola, with the exception of a couple of deepwater producing blocks, and the company operates Angola's only oil refinery. Sonangol owns 17 subsidiaries that operate throughout the oil and natural gas industries performing functions such as exploration, production and marketing of crude oil, storage, and marketing of petroleum derivatives.

Key subsidiaries include: Sonangol Pesquisa e Produção (P&P), which undertakes all exploration and production activities for Sonangol in Angola; Sonaref, which runs refining operations in Angola; and Sonangás, which runs Angola's natural gas sector. Sonangás was formed in 2004 and is tasked with the exploration, evaluation, production, storage, and transport of Angola's natural gas and natural gas derivatives. Sonangás is working with

Sonangol P&P to establish a regulatory environment—including taxation—to help spur research and development in the natural gas sector of Angola.

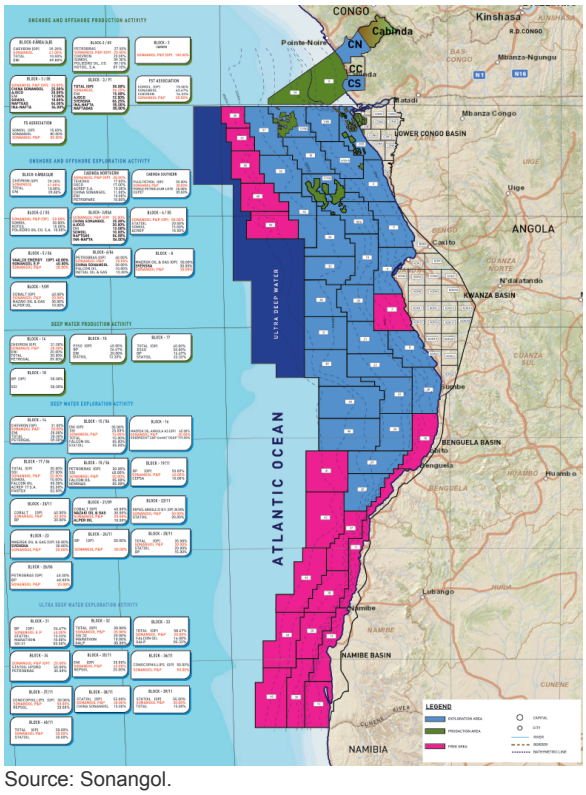
IOCs involved in Angola operate under joint venture operations and production sharing agreements (PSAs) with Sonangol. Major partners include Total, Chevron, ExxonMobil, BP, Statoil, and Eni, among others. China's Sinopec and the China National Offshore Oil Corporation (CNOOC) are also involved in Angola and provide development assistance as well as oil-backed loans and trade. Angola has been the second-largest crude oil exporter to China since 2005.

Sonangol is becoming more involved in international ventures, and the company currently has interests in Brazil, Cuba, Iraq, São Tome and Principe, Venezuela, and in the Gulf of Mexico. In early 2012, Sonangol pulled out of Iran's South Pars-12 natural gas project after U.S. sanctions on Iran were tightened. Sonangol continues to explore opportunities around the globe as it aims to establish itself as a major international player.

Angola has local content requirements in its energy sector. The requirements are under the umbrella of the "Angolanization" policy, which aims to increase the number of Angolans in management positions and Angolans hired as local contractors. The regulations require IOCs operating in the country to meet a 70% Angolanization threshold, but to date this figure has rarely—if ever—been met.

IOCs are also required to contribute to training programs in Angola. Companies are expected to provide $200,000 per year per block during the exploration phase of their operations to fund technical training programs and $0.15 per barrel of oil during the production phase, according to IHS CERA. These regulations are designed to improve the technical and financial capacity of Sonangol, its subsidiaries, and Angola's citizens. In 2011, Angola also passed a law that requires the IOCs to use local banks for all their transactions.

Angola concession map



Source: Sonangol.
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Oil

Sonangol is targeting a crude oil production rate of 2.0 million bbl/d in 2015 as new deepwater oil fields are scheduled to come online. Exploration activity in pre-salt formations is expected to ramp up this year, following the

most recent auction of pre-salt blocks publically announced in January 2011. Angola is planning to auction 10 onshore blocks believed to hold pre-salt prospects in 2014.

Angola holds almost 9.1 billion barrels of proved crude oil reserves, according to the latest estimates from the *Oil & Gas Journal* (OGJ) released in January 2014. Most of the proved reserves are located in the offshore parts of the Lower Congo and Kwanza basins. Typically, most exploration and production activities have been located in the offshore part of the Lower Congo basin, but the onshore and offshore Kwanza basin is receiving more attention from IOCs because of its pre-salt formations.

The west coast of Angola (along with some neighboring countries) shares geological similarities with Brazil's east coast, which contains pre-salt formations estimated to hold large quantities of hydrocarbon resources. The geological similarities stem from the separation of the African and South American tectonic plates through the Early Cretaceous period, explained by the scientific theory of plate tectonics and continental drift.

Three basins in Angola—the Lower Congo, Kwanza, and the not-yet-explored Namibe basins—are also believed to be major salt basins. The Kwanza basin, which shares similarities with Brazil's prolific Campos and Santos basins, is the current area targeted for pre-salt exploration by IOCs and Sonangol.

Production and exploration

Oil production in Angola gradually increased from the 1960s to the 1990s, reaching almost 750,000 bbl/d by 2000. During this period, production came mostly from offshore fields off the coast of Cabinda, an enclave and province of Angola that has been disputed. Deepwater exploration in Angola began in 1991 with the lease of Block 16. Additional deepwater blocks were licensed out in 1994, which led to more than 50 significant discoveries. As a result, between 2002 and 2008 oil production boomed as multiple deepwater fields came online.

Angola's total oil (petroleum and other liquids) production peaked in 2008, reaching nearly 2.0 million bbl/d, of which more than 1.9 million bbl/d was crude oil. Over the past few years, total oil production has averaged around 1.8 million bbl/d (1.7 million bbl/d of crude oil), despite some new oil fields coming online. Angola's production has been stagnant as a result of persistent technical problems related to water injection systems, gas cooling, and floating, production, storage, and offloading (FPSO) units associated with some projects. The technical problems have caused lengthy maintenance work and disruptions to supply from some fields. Rapid reservoir depletion has also resulted in steep decline rates at some fields.

Producing oil projects, operators, and loading ports in Angola

Operator	Partners	Projects	Location	Production[1] ('000 bbl/d)	Crude streams	Loading ports
ExxonMobil	BP, Eni, Statoil	Kizomba A (Hungo, Chocalho, Marimba)	Block 15 deepwater	400 - 430	Hungo	Kizomba A FPSO
		Kizomba B (Kizomba, Dikanza)			Kissanje	Kizomba B FPSO
		Kizomba C (Mondo, Saxi Batuque)			Mondo; Saxi Batuque	Mondo FPSO; Saxi Batuque FPSO
		Kizomba satellites project (Clochas, Mavacola)			blended with Hungo & Kissanje	Kizomba A & B FPSOs
Chevron	Sonangol, Total, Eni	Takula, Malongo, Mafumeira Norte	Block 0- Area A offshore	300 - 350	Cabinda	Malongo terminal
		Bomboco, Kokongo, Lomba, N'Dola, Sanha	Block 0- Area B offshore			
		Nemba, Tombua, Landana, BBLT (Block 14)[2]	Block 0- Area B offshore		Nemba	

	Eni, Sonangol, Total, Galp Energia, Inpex	Kuito, BBLT (Benguela-Belize-Lobito-Tomboco)	Block 14 deepwater	50	Kuito	Kuito FPSO
BP	Sonangol Sinopec International (SSI)	Greater Plutonio (Plutonio, Galio, Cromio, Paladop, Cobalto)	Block 18 deepwater	180	Plutonio	Plutonio FPSO
	Statoil, Sonangol, Marathon, SSI	PSVM (Plutão, Saturno, Vênus, Marte)	Block 31 ultra deepwater	100[3]	Saturno	PSVM FPSO
Total	Statoil, ExxonMobil, BP	Dalia	Block 17 deepwater	200	Dalia	Dalia FPSO
		Pazflor (Perpetua, Zinia, Hortensia, Acacia)		200	Pazflor	Pazflor FPSO
		Girassol, Jasmin, Rosa		200	Girassol	Girassol FPSO
Pluspetrol	Sonangol, Force Petroleum, Cubapetroleo	Cabinda C (South)	123-5 Cabinda onshore	production started at the end of 2013 (less than 10,000 bbl/d)	Cabinda	Malongo terminal
Somoil[4]	Chevron,Sonangol	Soyo	onshore			
Sonangol	Total,Chevron, Petrobras, Somoil, Kotoil, Poliedro, BTG Pactual	LomboEast	Block 2/85 offshore			
	Total, Eni, Inpex, Mitsui, Naftagas, Naftaplin, Mitsubishi, Somoil, Svenska, New Bright International Development	Palanca, Cobo, Pambi, Oombo, Nunce Sul	Block 3 offshore	50	Palanca	Palanco terminal
	Statoil, Somoil, Angola Consulting Resources	Gimboa	Block 4/05 deepwater	<10	Gimboa	Gimboa FPSO

[1] Crude oil production levels in 2013 are based on commercial tanker loading data.

[2] The light stream of BBLT is mixed with the Nemba blend and the heavy stream is mixed with the Kuito blend.

[3] PSVM is expected to increase to 150,000 bbl/d in 2014.

[4] Somoil is a private company based in Angola.

Source: U.S. Energy Information Administration based on data from company reports, Rystad, IHS World Markets Energy, Energy Intelligence, and APEX Tanker Data

Despite technical problems at some fields and natural production decline, Angola has several oil projects scheduled to start producing in the next five years. The latest projects to come online were the Kizomba Satellites Phase I and the PSVM (Plutão, Saturno, Vénus and Marte). Kizomba Satellites Phase I, operated by ExxonMobil, started commercial production in July 2012 and has a peak capacity of 100,000 bbl/d. The Phase I project is an extension of the other Kizomba projects, which started producing in the 2000s: Kizomba A in 2004, Kizomba B in 2005, and Kizomba C in 2008. ExxonMobil and its partners at block 15 plan to expand the Kizomba area more with the development of Kizomba Satellites Phase II project, which is scheduled to start in 2016 and peak at 125,000 bbl/d.

PSVM, which consists of four fields—Plutão, Saturno, Vénus and Marte—is operated by BP in block 31. Initial production started from the Plutão field in December 2012, followed by Saturno and Vénus. Marte is expected to begin producing in 2014, and total output at PSVM is expected to plateau at 150,000 bbl/d.

Upcoming oil projects in Angola

Project	Peak production (000 bbl/d)	Operator	Est. start	Location	Notes
CLOV (Cravo-Lirio-Orquidea-Voleta)	160	Total	2014	Block 17 deepwater	Expected to start the second half of 2014

West Hub project (Sangos, N'Goma, Cinguvu)	80	Eni	2014+	Block 15/06 deepwater	Leased Xikomba FPSO
Mafumeira Sul	120	Chevron	2015	Block 0 offshore	Associated natural gas will be sent to the LNG plant in Soyo, Angola
Lianzi field	46	Chevron	2015	Block 14 deepwater	Located in the offshore unitization zone between Angola and Congo (Brazzaville)
Kizomba Satellites Phase II	125	ExxonMobil	2016	Block 15 deepwater	Combines the development of Kakocha, Bavuca, and Mondo South fields
Negage	75	Chevron	2016+	Block 14 deepwater	Near the Lianzi field and the border with Congo (Brazzaville)
Lucapa	100	Chevron	2016+	Block 14 deepwater	Near the Lianzi field and the border with Congo (Brazzaville)
East Hub project (Cabaca Norte, Sout-East)	80+	Eni	2016+	Block 15/06 deepwater	Additional development phases are planned to start production from neighboring discoveries
B31 SE	200+	BP	2016+	Block 31 ultra deepwater	Discovery of Palas, Ceres, Juno, Astrea, Hebe, Urano, Titania, Terra Miranda, Cordelia, Portia
Kaombo Project	200	Total	2017	Block 32 ultra deepwater	Feasibility studies are underway to determine whether to proceed with development

Source: U.S. Energy Information Administration based on company reports and Oil & Gas Journal

The next major oil project scheduled to start up is Total's CLOV (Cravo-Lirio-Orquidea-Voleta), located in the deepwater within Block 17. CLOV is expected to start producing in the second half of 2014, eventually peaking at 160,000 bbl/d in 2015. Sonangol hopes that CLOV will help Angola reach its production target of 2.0 million bbl/d in 2015.

Eni forecasts that its West Hub project, which would be the first production in the Eni-operated Block 15/06, will start in 2014 and peak at 80,000 bbl/d. Chevron has two projects scheduled to come online in 2015, the Mafumeira Sul and Lianzi field. The Mafumeira Sul is expected to peak at 120,000 bbl/d (110,000 bbl/d of crude oil and 10,000 bbl/d of liquefied petroleum gas). Associated gas is slated to go to Angola's sole LNG plant in Soyo.

The Lizani field is located in a unitized offshore zone between Angola and the Republic of Congo (Brazzaville), and it is the first cross-border development of its kind in the region. Chevron, through its subsidiary Chevron Overseas Congo Limited, is the operator, holding a 31.25% share in the project. Its partners are Total (36.75%), Eni (10%), Sonangol (10%), Congo's national oil company SNPC (7.5%), and the Portuguese company GALP Energia (4.5%). The field is slated to be connected to the BBLT development in Block 14 for export and produce a maximum of 46,000 barrels of oil equivalent per day (boe/d).

Onshore production and exploration

Most exploration activity in Angola is conducted offshore at depths of over 1,200 meters (3,937 feet). Sonangol estimates that each deepwater well costs between $20 million to $50 million to develop. Exploration activities in Angola's onshore have been limited over the past decades because of the civil war (1975-2002). But over the past few years, onshore exploration has resumed, but at a much slower pace compared with offshore activities.

Recent onshore exploration activity has mostly been in the Lower Congo basin onshore area in the Cabinda North and South blocks. Sonangol, with China Sonangol, carries out exploration activity at Cabinda North. Exploration at the onshore Cabinda South block was initially led by Roc Oil Company based in Australia, but was later taken over by Pluspetrol Angola, a subsidiary of Argentinian group Pluspetrol, with partners Sonangol and Cubapetroleo. Exploration at the Cabinda South block started in 2007, and production

started in late 2013, but the fields are expected to produce less than 10,000 bbl/d.

Somoil, a privately-owned Angolan company, is also pursuing exploration activities in the onshore Soyo areas. Somoil is currently producing small quantities of oil (less than 5,000 bbl/d), which is being blended and exported with the Sonangol-operated fields that make up the Palanca blend. Somoil is the only privately-owned company based in Angola that operates oil fields in the country.

Pre-salt

The first pre-salt discoveries in Angola were the Denden 1 well in block 9 in 1983, operated by Cities Services at the time, and the Baleia 1A well on block 20 in 1996 operated by Mobil (now ExxonMobil). Both blocks are now operated by the U.S.-based Cobalt International Energy. The Danish company Maersk Oil made the first recent pre-salt discovery in the Kwanza basin in 2011 with the Azul well on block 23. Maersk continues to study the results of the well and plans to appraise it.

Cobalt has had the most success with pre-salt exploration in Angola, making five pre-salt well discoveries in blocks 20 and 21 to date (Cameia 1 & 2, Mavinga, Lontra, and Bicuar). Cobalt's five finds have encountered pre-salt hydrocarbons, in the form of liquid and gas. Cobalt plans to move toward sanctioning the Cameia field in 2014, with first production targeting 2017.

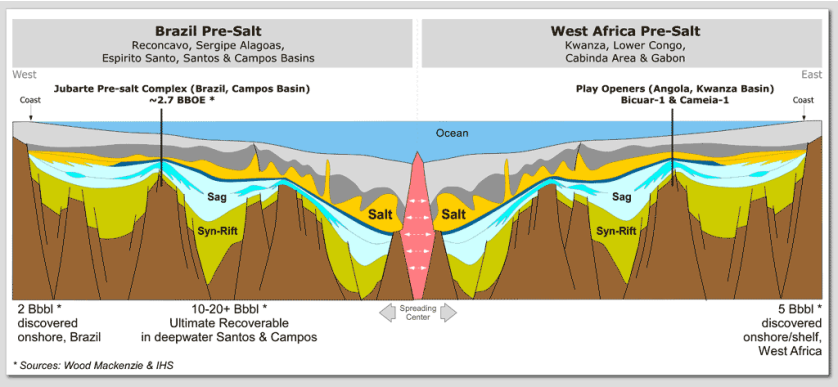
There are many IOCs invested in Angola that are currently or planning to undergo exploration activity in pre-salt bearing blocks, many of which were awarded around January 2011, including Cobalt's block 20. In January 2011, Angola announced that it awarded 11 pre-salt offshore blocks in the Kwanza basin, following a closed licensing round in which a select few IOCs were invited. Seismic and exploratory drilling in pre-salt formations is expected to accelerate in 2014. Angola is also planning to auction 10 onshore blocks believed to hold pre-salt prospects in the Lower Congo and Kwanza basins in 2014.

Pre-salt exploration in Angola

Blocks	Operators	Partners	Recent discoveries
6/06	Petrobras	Sonangol P&P, Falcon Oil, Initial	
8	Maersk	Sonangol P&P, Svenska Petroleum	
9	Cobalt	Sonangol P&P, Nazaki, Alper	
19	BP	Sonangol P&P, China Sonangol International	
20	Cobalt	Sonangol P&P, BP	Lontra 1
21	Cobalt	Sonangol P&P, Nazaki, Alper	Cameia 1 & 2, Mavinga 1, Bicuar
22	Repsol	Sonangol P&P, Statoil	
23	Maersk	Sonangol P&P, Svenska Petroleum	Azul 1
24	BP	Sonangol P&P	
25	Total	Sonangol P&P, Statoil, BP	
26	Petrobras	BP	
35	ENI	Sonangol P&P, Repsol	
36	ConocoPhillips	Sonangol P&P, China Sonangol International	
37	ConocoPhillips	Sonangol P&P, Repsol	
38	Statoil	Sonangol P&P, China Sonangol International	
39	Statoil	Sonangol P&P, Total	
40	Total	Sonangol P&P, Statoil	

Source: Company reports and Sonangol

Angola - Brazil sub-sea geology



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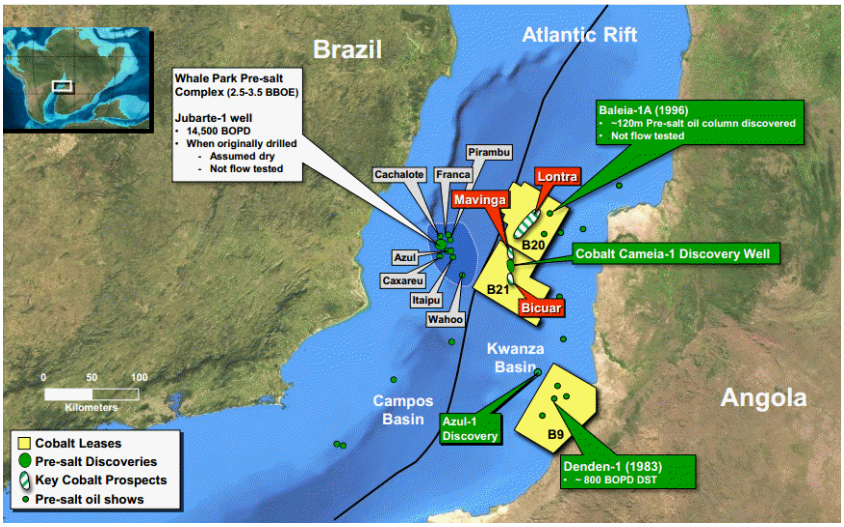
Pre-salt formations in Angola and Brazil



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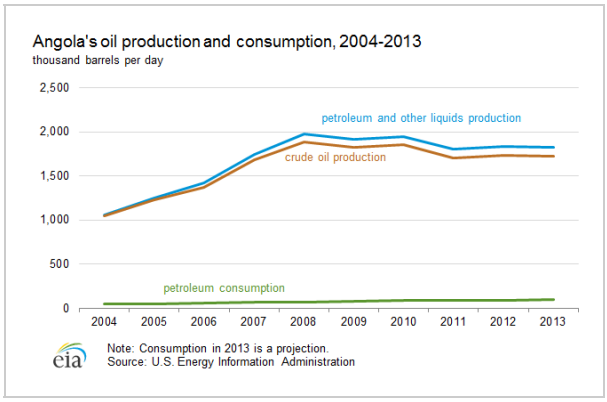


Refining and downstream

Angola has one small refinery that was constructed in 1955 and has a capacity of 39,000 bbl/d. Construction on a new Sonaref refinery in Lobito started in December 2012. The refinery is scheduled to come online in 2017 with a initial processing capacity of 120,000 bbl/d. The refinery's capacity is scheduled to increase to 200,000 bbl/d in 2018. The refinery will run on Angola's crude oil, and refined products will be sold to domestic and international markets. In December 2013, Sonangol hired Standard Chartered Bank UK to provide financial consulting during its construction.

Angola consumed roughly 94,000 bbl/d of petroleum products in 2012, almost double the volume consumed a decade ago. Angola imports more than half of the petroleum it consumes. Domestic demand for petroleum remains relatively low because of low levels of economic development. Transportation fuel prices are among the lowest in the world

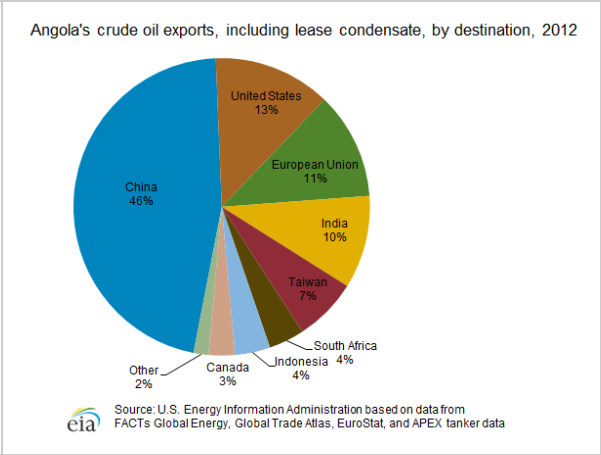
because of state subsidies that have been in place for years. According to a June 2013 IMF report, Angola's fuel-subsidy costs are estimated to be the highest in Sub-Saharan Africa, estimated at about 5%vof GDP in 2012, equivalent to half of total capital spending.

Exports

Angola has been the second-largest supplier of crude oil to China since 2005, behind Saudi Arabia. The United States, the European Union, and India are also major destinations for Angolan oil. However, U.S. imports of Angolan crude oil continue to decline because of increased U.S. production of similar quality crude grades.

In 2012, Angola exported about 1.7 million bbl/d of crude oil, including lease condensate, and nearly half went to China (46%). Angola has been the second-largest supplier of crude oil to China since 2005, behind Saudi Arabia. The United States (14%), the European Union (11%), and India (10%) are also major destinations for Angolan oil. The majority of Angolan crude oil is medium-to-light in density and has low sulfur content. Nearly all of Angola's oil production is exported as Angola's domestic refining capacity is limited.

The United States has been importing oil from Angola since the 1970s. Angola accounted for 5% of total U.S. crude oil imports between 2005 and 2009, supplying the United States with an annual average of 480,000 bbl/d during that period. U.S. imports of Angolan oil have decreased since then, in terms of the absolute volume and share. In 2012, the United States imported 222,000 bbl/d of crude oil from Angola, accounting for 3% of total U.S. imports and placing Angola as the ninth-largest supplier of crude oil to the United States. The growth in U.S. light, sweet crude oil production from the Bakken and Eagle Ford has resulted in a sizable decline in U.S. imports of similar quality crude grades.



Natural gas

Angola currently produces small quantities of marketed natural gas as the vast majority of the country's gross production is flared (burned off) or re-injected into oil wells. However, in mid-2013, Angola began exporting liquefied natural gas (LNG), following the recent start-up of the LNG plant at Soyo. Angola hopes to commercialize more of its natural gas resources for export and for domestic consumption.

Angola holds an estimated 9.7 trillion cubic feet (Tcf) of proved natural gas reserves, according to the latest OGJ estimates released January 2014. Angola only produces small quantities of commercially marketed natural gas because the vast majority of its production is flared or re-injected into oil fields to aid recovery. Until recently, Angola lacked much of the infrastructure needed to commercialize more of its natural gas resources. The construction of Angola's first LNG facility at Soyo was recently completed, and it shipped out its first cargo in June 2013 to Brazil.

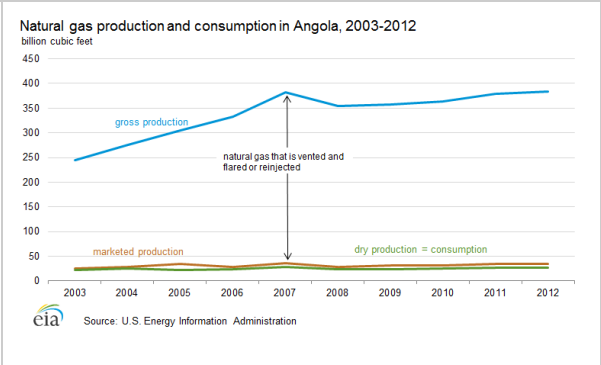
Exploration and production

Gross natural gas production in Angola has almost quadrupled over the past two decades, growing from 97 billion cubic feet (Bcf) in 1990 to 383 Bcf in 2012. The vast majority of Angolan natural gas is re-injected into oil fields to help recovery or it is vented or flared as a

by-product of oil operations. In 2012, 91% of gross natural gas production was re-injected or it was vented or flared. Angola's natural gas production comes entirely from associated fields, although Angola LNG, the operator of the facility, plans to develop some previously-discovered non-associated natural gas fields.

Chevron's $1.9 billion Sanha project (located offshore near Soyo) began operations in 2005, and is capable of processing 100,000 bbl/d of oil, condensate, and liquefied petroleum gas (LPG). The project significantly reduced the need for gas flaring in block 0 because dry natural gas (which is what remains after the raw product is stripped of condensate and LPG) is re-injected into the Sanha reservoir to help with oil recovery operations. This process is estimated to both reduce flaring in Block 0 by at least 50% and to reduce carbon dioxide emissions by more than 2.0 million tons per year, according to Offshore Magazine. The Takula gas processing platform began operating in late-2008 and also reduced gas flaring in block 0. Takula processes gas for re-injection and for the Cabinda gas plant. The Cabinda gas plant processes gas for a nearby power plant, according to IHS CERA. Sonangol also plans to further reduce gas flaring by bringing online a gas condensate facility to produce liquefied petroleum gas (LPG). It is scheduled to come online in 2015.

With offshore oil exploration continuing apace, Angola will need to address its capacity for processing the large volumes of associated gas its oil operations will continue to produce. Enhancing LNG capabilities, developing the domestic market for commercial natural gas, and enhanced oil recovery techniques will be important components to Angola's natural gas strategy moving forward.



Liquefied natural gas (LNG)

Central to Angola's plan to commercialize more of its natural gas reserves is the LNG facility at Soyo, which began exporting LNG in 2013. Operations were set to begin in the first quarter of 2012, but many delays pushed the start date further into the future. Angola LNG is the operator of the new facility. The consortium includes: Sonangol (22.8%), Chevron (36.4%), Total (13.6%), BP (13.6%), and Eni (13.6%). According to Angola LNG, the project represents the largest single investment in Angola's history.

The LNG plant is currently operating below capacity because of technical problems, and exports have been infrequent. When the LNG plant reaches full capacity, it will receive 1 Bcf/day of associated gas from offshore oil fields and produce 5.2 million tons per year of LNG, natural gas liquids, and up to 125,000 cubic feet per day of natural gas for domestic consumption. Associated natural gas will be sourced from various offshore and deepwater oil fields within blocks 0, 14, 15, 17, and 18. Angola LNG also plans to develop non-associated gas fields in blocks 1 and 2 to feed the LNG plant.

Initial plans called for Angola's LNG cargoes to be shipped to a re-gasification facility in Pascagoula, Mississippi in the United States. However, U.S. natural gas imports have declined drastically because of the recent boom in domestic natural gas production. Angola LNG is now targeting consumers in Asia and Europe, although its first cargo was shipped to Brazil.

Electricity

Angola's electricity infrastructure was damaged substantially during its civil war (1975-2002). The Angolan government, with financial assistance from China, has made notable improvements to its power sector, and electricity

capacity has more than doubled since the end of the war. However, more than half of the country's inhabitants still do not have access to electricity and rely on traditional biomass and waste (mostly wood and charcoal) to meet their household energy needs.

Angola's electricity sector is dominated by the state company Empresa Nacional de Electricidade (ENE), but some private companies in the extractive industries have built power plants to run their operations. Angola is a member of the Southern African Power Pool (SAPP), a group that includes Botswana, the Democratic Republic of the Congo (DRC), Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. The SAPP is designed to promote cooperation between member countries with the aim of creating a common electricity market that can provide reliable and affordable electricity to the citizens of member countries.

Currently, Angola does not have a national electricity grid, and instead the country relies on three independent systems that provide electricity to different parts of the country: the Northern, Central, and Southern Systems, according to IHS CERA. The Northern System is connected to the Kwanza (Cuanza) river basin and is the country's largest, serving the country's capital, Luanda. The Central and Southern Systems are linked to the Catumbela and Cunene river basins, respectively. The government hopes to link the three independent grids as part of a national grid system and eventually link its grid with neighboring SAPP members.

Angola has an installed electricity capacity of almost 1,700 megawatts (MW), of which around 60% is from hydroelectric facilities. The remainder is from fossil fuel plants, according to EIA's latest 2011 estimates. The latest 2010 estimate from the World Bank indicates that only 40% of Angolans have access to electricity, leaving around 8 million people without access. In late 2011, the Angolan government announced that it intends to invest $16 billion in the electricity sector by 2016 in an effort to improve the country's transmission and distribution networks, which were significantly damaged during the 27-year long civil war (1975-2002), and to help bring electricity to the country's remote rural regions. The plan proposes to increase overall electricity supplies by more than 10% to help meet rising domestic demand.

In 2011, Angola generated more than 5.5 million kilowatthours of electricity, coming from hydro and fossil fuel sources. More than 70% was generated at the country's hydroelectric facilities, primarily from hydroelectric dams on the Kwanza (Cuanza), Catumbela, and Cunene Rivers. Some analysis suggests that the country's potential hydroelectric generating capacity is well over 10 times the currently installed capacity, but tangible plans to develop the country's hydroelectric resources have not yet emerged. The largest facility is the Capanda hydropower dam, which has installed capacity of 520 MW.

Given Angola's plans to commercialize more of its natural gas resources, natural gas fueled generation is likely to become increasingly important in the coming years. There have been discussions about building gas-fired facilities near the country's oil operations, in part to support industry there, but firm proposals have yet to emerge. In 2006, Angola also began discussions with the International Atomic Energy Agency about developing a domestic nuclear power program, but details remain scarce and any project is still decades away from becoming a reality.

Notes

- Data presented in the text are the most recent available as of February 5, 2014.
- Data are EIA estimates unless otherwise noted.

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